

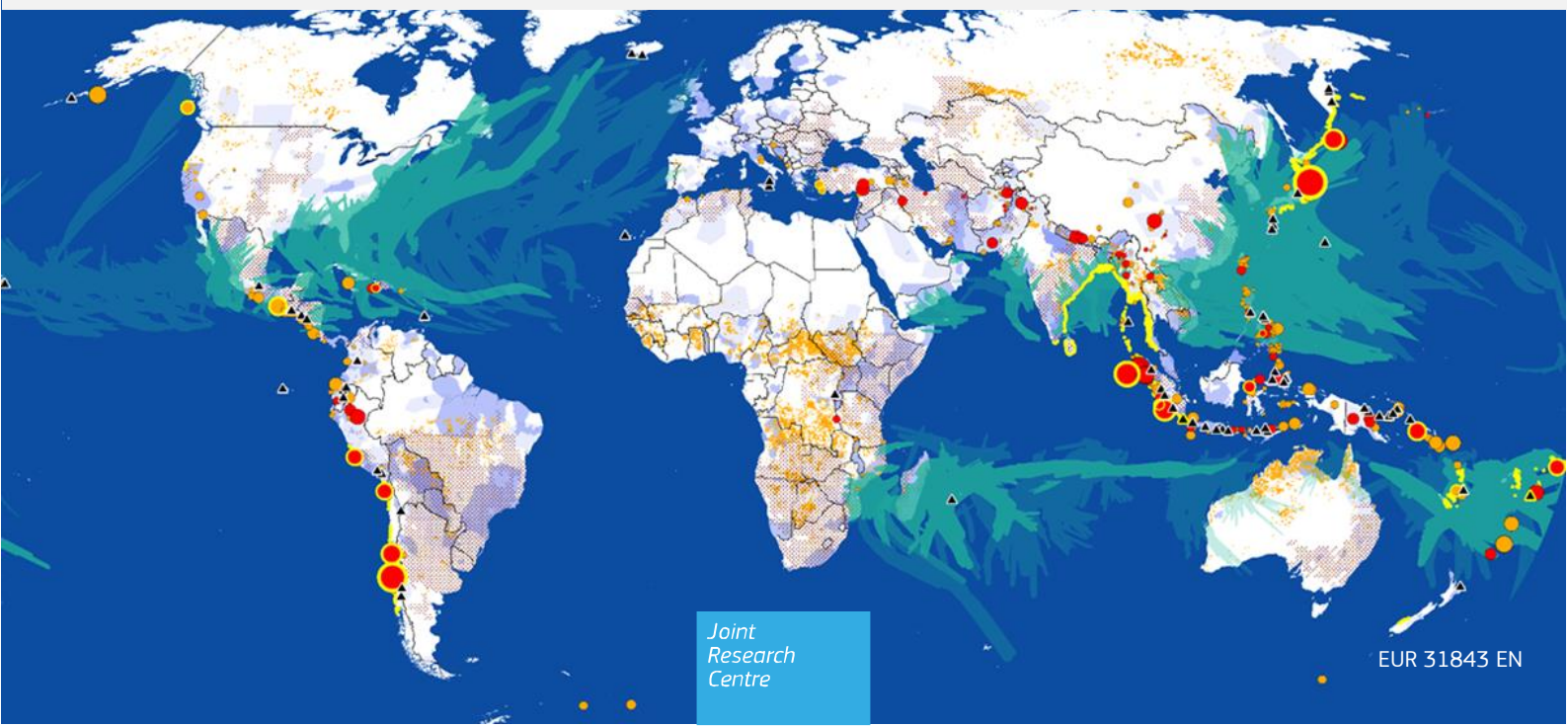


Mapping for Crisis Management

*DG ECHO Daily Maps and Situation Maps
April – June 2023*

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Abstract

Disaster Risk Management (DRM) is a complex and interdisciplinary field that requires accurate, reliable visual products and reporting material to support the decision making process. In the disaster cycle there are two key phases to consider: before and after the event. Each phase consists of various components. The pre-occurrence phase focuses on risk assessment, prevention and preparedness, while the post-occurrence phase encompasses response to the event, damage assessment, and recovery/restoration.

The main objective of this quarterly report is to show how the European Crisis Management Laboratory (ECML) Mapping Team at the Joint Research Centre (JRC) plays a key role in delineating all the components of those phases with its daily situational awareness reports (ECHO Daily Flash and ECHO Daily Maps) and on-demand products (ECHO Situation Maps/Infographics). The team uses a variety of data sources (e.g. satellite imagery, geographical and ancillary data, statistical repositories), to produce maps and situational reports that depict the spatial distribution of hazards, vulnerabilities, as well as capacities in coping with them. In so doing it collaborates with experts from other fields inside and outside the European Commission.

Besides contributing to identifying high-risk areas, helping in prioritize interventions and facilitate the communication with stakeholders, these products also represent an essential tool used by the Emergency Response Coordination Centre (ERCC) at the Director General European Civil Protection and Humanitarian Aid Operations (DG ECHO) for its daily activity of monitoring disasters occurring all over the globe.

The function of the ECML Mapping Team is a crucial and challenging one that requires a multidisciplinary and collaborative approach along with the employment of various highly specialized skills and expertise. This report is the second one of its kind (previous one, JRC133755, was focused on the first quarter of 2023¹) will introduce and explain the role of the team in maximizing the outcomes when analysing disaster events and their management in the second quarter of 2023.

¹ The report is available here: <https://op.europa.eu/en/publication-detail/-/publication/ffb785fe-31ab-11ee-946a-01aa75ed71a1/language-en>

1 Introduction

Maps and infographics play a fundamental role in Disaster Risk Management (DRM). From a practical standing point, they are key in identifying areas at high risk of being affected by a disaster (the so-called preparedness phase), planning for emergency management and humanitarian response in general and determining resources for coping with these events. In post-disaster conditions they are useful in damage assessment as well as monitoring the progress of recovery efforts. However, the importance of maps extends beyond just these practical uses. Maps also serve as a communication tool, raising awareness among communities about the risks they face and the steps they can take to prepare for disasters. In order to provide the most updated and reliable products, the team collaborates with experts from inside and outside the European Commission. Satellite imagery, spatial elaborations, and geographical data of any sort are harmonized and thoroughly put together to ensure the quality of the outcomes.

The Emergency Response Coordination Centre (ERCC) at the Director General European Civil Protection and Humanitarian Aid Operations (DG ECHO) makes an extensive (and intensive) use of these products. In fact, maps, infographics and situational reports produced by the team are pivotal in its daily activity of monitoring disasters around the globe and efficiently managing effective responses by the Union Civil Protection Mechanism. All public maps produced by the European Crisis Management Laboratory (ECML) Mapping Team of the Joint Research Centre (JRC) are published and available in the Emergency Response Coordination Centre (ERCC) portal².

This report is the second release of a series of quarterly reports. It covers the period from 1 April to 30 June 2023, i.e. the second quarter of the year (Q2 from this point further throughout the document) whereas the first release covered the period from 1 January to 31 March (Q1). It shows the daily and non-daily activities of the ECML Mapping Team in support of DG ECHO as a whole and to the ERCC in particular.

The purpose of this document is to show the products collected in the ERCC portal and to highlight the main topics, related to natural disaster events or humanitarian crises, occurred over the last three months. The choice of the trimestral frequency is to try to detect early on possible trends in hazardous events (e.g., droughts, cyclones, famine), without waiting to analyse them only on an annual basis. The plan is to compile the four quarterly reports of 2023 into an overall annual report.

This document is intended to support the reader to have a knowledge of what happen periodically across the world, how many events occurred, and which are most/worst affected countries by one or multiple natural disaster events or crises. Moreover, it shows in a dedicated section, how the details of the humanitarian impact and the evolution of a natural event have been collected, considering that one of the main purposes of the activities is to use official sources as agreed with the ERCC. The present report includes the three pillars briefly aforementioned: ECHO Daily Flash, ECHO Daily Map and ECHO Situation Maps/Infographics.

The ECHO Daily Flash is a daily snapshot on unfolding disasters and main humanitarian crises, in Europe and the World. The product consists of short summaries of the main natural events of the past few days, presented in short bullet points, in neutral, simple language, sticking to facts and figures, with an emphasis on the Union Civil Protection Mechanism added value.

The ECHO Daily Map depict a significant event on a daily basis. Following a thorough analysis of the current situation (and supported by the Daily Flash), the ERCC decides what is to be mapped. At this point the ECML Mapping Team collects all the necessary information to produce the map that will be delivered at the end of the day. This high frequency of production determines the maps purpose: rather than providing a general summary of interacting factors for a prolonged period, they tend to represent specific events for short and fixed periods in time. It should be noted that every request to the team and its deliverable is to be made and collected in the ERCC Portal, which is also designed, developed and maintained for the ERCC by the ECML team which advises its development on the basis of its experience, knowledge of the user needs in the disaster risk management domain and based on a daily collaboration with the ERCC personnel. This is the one-stop point of access of all the interactions between the mapping team and ERCC.

² <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/latest>

Contrary to the daily production of both the ECHO Daily Flash and the ECHO Daily Maps described above, ECHO Situation Maps/infographics are produced on-demand. ERCC Duty Officers, ECHO Field Officers, ECHO Geo-desks and everyone who have access to the service, can request a map via the ERCC Portal and upload the eventual necessary information available for its production. At this point the system is activated, notifying the team that will proceed with the map-production. Not following a daily frequency, the majority of these maps are overviews of complex situations over medium-long time periods.

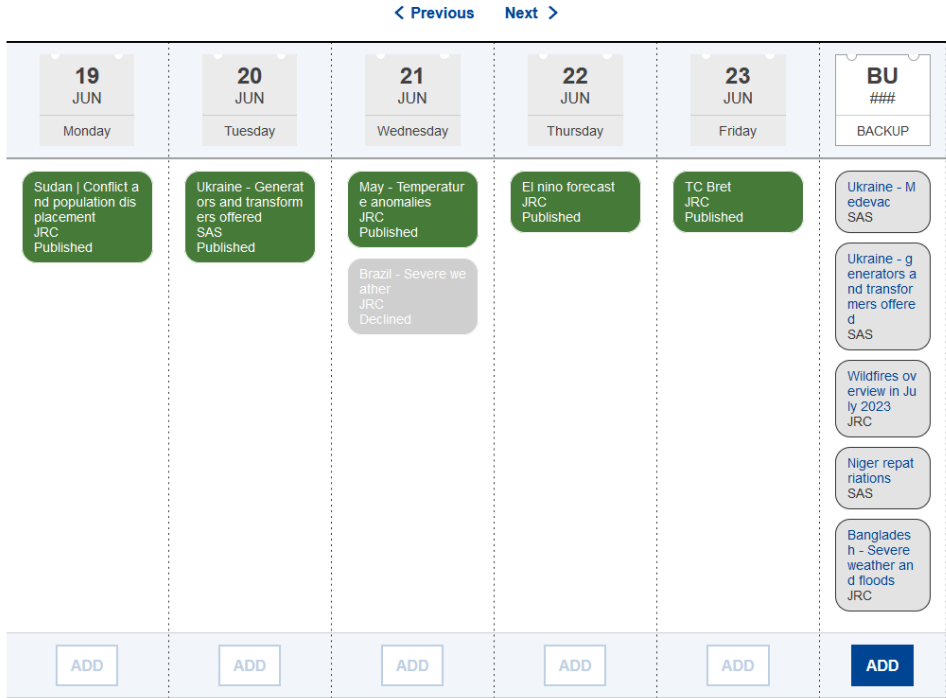
Finally, it is important to note that not the entire production of the ECHO Daily Maps are in charge from the ECML Mapping Team. A number of these are produced by the DG ECHO A3 Situational Awareness Sector (SAS) mainly not representing topics related to natural disaster (i.e. funding, factsheets, resources) and at a Europe-wide or global scale. Moreover, a limited number of Daily Maps are produced in cooperation between the ECML Mapping Team and the DG ECHO A3 SAS, usually for long-lasting crisis that need several maps for monitoring an already occurred events (e.g. the devastating earthquake occurred in Türkiye and Syria). The Daily Maps directly produced by the DG ECHO A3 SAS are not analysed in the present report.

In this trimester, the ECML Team developed and implemented a new functionality in the ERCC portal where the users can insert the planned Daily Maps decided after the weekly meeting between the ERCC and the ECML Team (Figure 1).

Figure 1. Example of the ECHO Daily Maps weekly plan (developed for the ERCC Portal by the ECML) containing both maps produced by the ECML Teams and by the DG ECHO A3 SAS.

MAP REQUESTS

Weekly plan From 19-06-23 to 23-06-23



2 ECHO Daily Maps and ECHO Daily Flash

2.1 General aspects

One of the main goals of both the ECHO Daily Maps and ECHO Daily Flash is the representation of a given event in the most reliable way, naming from the data and figure sources perspective. The purpose of and the request from ERCC are to reach authoritative information from national authorities, rather than media that can over or underestimate the relevance of a particular natural event. For this reason, in all the Daily Maps, both the figures of humanitarian impact, humanitarian response and the scientific contents are from official and authoritative sources. About the humanitarian impact and humanitarian response, DG ECHO is the main used source (considering also that the main purpose is to map events related to DG ECHO humanitarian and civil protection interventions) during this Q2 (as for the previous Q1). Furthermore, for the humanitarian impact figures in terms of numbers of casualties or affected and especially evacuated people, UN OCHA has been used for several events in the Q2 (also in this case it confirms a general continuity with the Q1).

Regarding the scientific data, the main provider in quantitative terms of this second trimester of the year is the JRC itself, by means of data produced and delivered by the ECML team (the Global Disaster Alert Coordination System -GDACS data, above all) or by other teams within the Disaster Risk Management Unit (JRC E.1), like GHSL, GWIS, GLOFAS, EDO and GDO. It is important to mention also other scientific data producers/providers used by the ECML team, the most significant and global ones are NOAA, JTWC, HWRF, ECMWF, GFS and GPM for meteorological data (including tropical cyclones data), MODIS for floods and USGS for seismic data.

2.2 April significant events

The events occurred during the first month of the Q2 (April 2023) are various and it is not possible to identify a major, single, event lasting throughout the whole month. However, continuities emerge from the seismic activity in Türkiye and Syria (started on 6 February), from the rainy season in South America and from the drought situation across Europe.

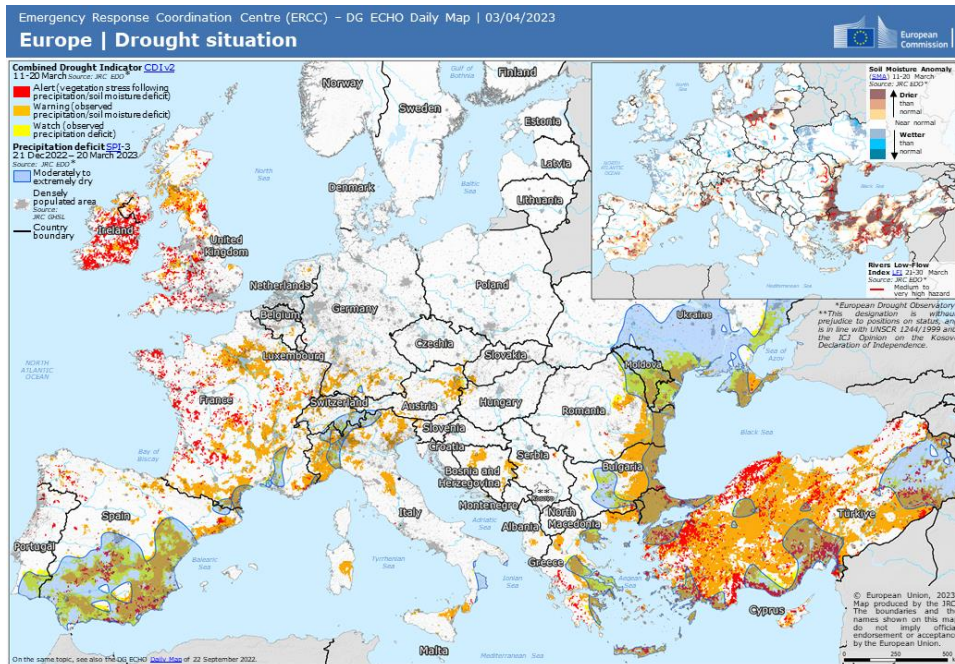
The Türkiye and Syria earthquakes have been devastating (thousands of fatalities and millions of displaced across several Provinces of southern Türkiye and Governorates of north-western Syria), their effects have been analysed not only in February and March of the Q1 report but also in April, providing continuity with the previous period of concern. The last ECHO Daily Map on this event (24 April) shows the huge efforts of the EU response in term of both UCPM and Copernicus Emergency Management Service Rapid mapping (EMSR) activations³.

Regarding the rainy season in South America, the northern region of the continent receives most of its rainfall during the southern hemisphere summer (October to April). For this reason, two DG ECHO Daily Maps were produced on Ecuador and the neighboring Peru (in this Country the UCPM was activated too), depicting floods and severe weather occurred in April that resulted, considering both Countries, in over 120 fatalities and more than 320 000 affected people.

The last topic of concern for the daily maps production of this month was the drought situation across Europe. The map of 3 April (Figure 2) represents the combined drought indicator, the soil moisture anomaly and the precipitation deficit of the previous month of March. This drought situation is a prolonged one, already analysed by means of several maps produced during summer and autumn 2022. The map highlights that the most significant drought affected Türkiye and southern Spain. It is important to note that this latter area has been severely affected by heatwave during the month of July, it will be mentioned in the Q3 report as well. These maps mark the very powerful cooperation between the EDO team and the ECML team within the Unit E.1.

³ <https://emergency.copernicus.eu/mapping/list-of-activations-rapid>

Figure 2. ECHO Daily Map of 3 April on drought in Europe.

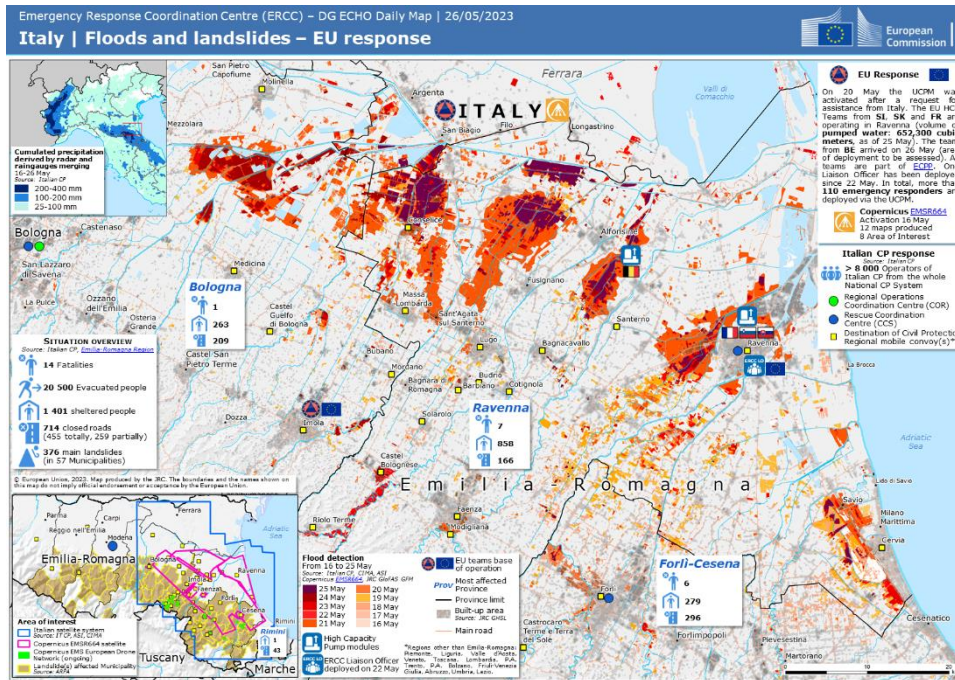


2.3 May significant events

During the second month of the Q2 (May 2023) the most important event was, above all, the severe weather occurred across the Emilia-Romagna Region (northern Italy) since 15 May that have caused severe floods and an impressive number of landslides. From the impact point-of-view, the event resulted in several human losses (14), several displaced people (more than 20,000, of whom over 1,400 across several evacuation centres), and widespread damage (a huge amount of buildings and more than 400 roads). Particularly, the event triggered approximately 400 damaging landslides and the flooding duration was around 10-days. The ECML team produced three daily maps on the topic, in particular, Figure 3 (26 May Daily Map) shows the flood detection from 16 to 25 May, the impact overview and the cumulated precipitation over the area. Also in this case the EU response was promptly activated, by means of the UCPM activation and the Copernicus EMSR (rapid mapping) activation and reported in the maps. The Copernicus EMSR produced 12 maps for eight areas of interests.

During the same month of May, a significative occurrence was the tropical cyclone named MOCHA over Myanmar and southern Bangladesh, occurred from 12 to 15 May. The impact was severe, with around 100 000 evacuated people in Myanmar and approximately 750 000 in Bangladesh. Severely affected were the Rohingya refugees and Internally Displaced People (IDP) camps in both countries. GDACS promptly issued a red alert. Also in this case, the Copernicus EMS was activated in rapid mapping mode.

Figure 3. ECHO Daily Map of 26 May floods and landslides in Emilia-Romagna Region (northern Italy).



2.4 June significant events

The most significant event of the last month of the Q2 (June 2023) is the Nova Kakhovka Dam breach. The dam breach occurred on 6 June, causing in the downstream area 9 fatalities, 2 743 evacuated people and severe concerns regarding the impact and the operational status on the Zaporizhzhya Nuclear Power Plant (ZNPP) upstream. Three daily maps were produced on 6 June (the same day when the event started), 8 June and 12 June representing a simulated flooding scenario and the evolution of the observed flooding situation. On 6 June the map shows the numerical simulation flood extent for two dam breach scenarios considering a full dam breach of 380 m and a partial dam breach of 80 m. These two scenarios were made ready in November 2022 by the ECML team, anticipating a possible situation of dam breach, given the damaged status of the dam. In addition, the mentioned map includes the localization of the most critical infrastructures that could have been affected. On 8 June the map represents the observed flood extent on 6 June and 7 June. Moreover, a graph that analysed the water level of the Kakhovka dam/hydro power plant was also included. It shows the water dropping after the dam breach from satellite data (Copernicus and Global Reservoirs and Lakes Monitor, G-REALM) and from *in situ* data (from International Atomic Energy Agency, IAEA and Ukraine national authority). On the map of 12 June (Figure 4) the calculated water depth and flood duration of the observed flood extent over 6-10 June is represented, along with an updated version of the observed water drop. It is important to note that the most updated depicted situation of the Nova Kakhovka Dam breach is represented by two ECHO Situation Maps (see below the relevant section) of 16 June and 21 June (with the flood duration up to 20 June, for this latter map). After a first period of Daily Maps on the topics, useful for an assessment of the event, ECHO requested two Situation Map, more suitable for a monitoring of the event itself.

A further topic very important for the Q2 was the analysis of the global temperature and precipitation rate anomalies and El Niño impact forecast at the global scale. El Niño Southern Oscillation (ENSO) is an irregular oscillation of the climate system that naturally occurs over the tropical eastern Pacific every 2 to 7 years. It is one of the most important sources of interannual variability of the climate system worldwide due to its ability to change the global atmospheric circulation. The map is a result of El Niño impact forecast and other climate drivers acting simultaneously with ENSO for the period July – August – September (JAS) 2023. The ensemble mean anomalies of the sea surface temperatures (SSTs) and the 2-meter air temperature (°C) over the continental land masses are represented. Moreover, the precipitation anomaly rate in mm/day overlaps the temperatures showing the areas that are related to El Niño (Figure 5).

It is important to note two aspects regarding the request from ERCC on the ENSO phenomenon. Firstly, an in-depth analysis, by means of a JRC Emergency Report, was requested by ERCC on 19 June. This (not public)

Science for Policy report added further details, analysis and investigations (both on the geographical and the temporal aspects) to the DG ECHO Daily Map above mentioned and it is part of the situational awareness activities (like the Daily Maps) of the JRC. Secondly, also in the past DG ECHO requested a Daily Map on El Niño, which was produced by the JRC and published on 9 June 2016, attesting the continuous long-lasting monitoring of the phenomenon by ERCC and the JRC.

Figure 4. ECHO Daily Map of 12 June on Nova Kakhovka Dam breach.

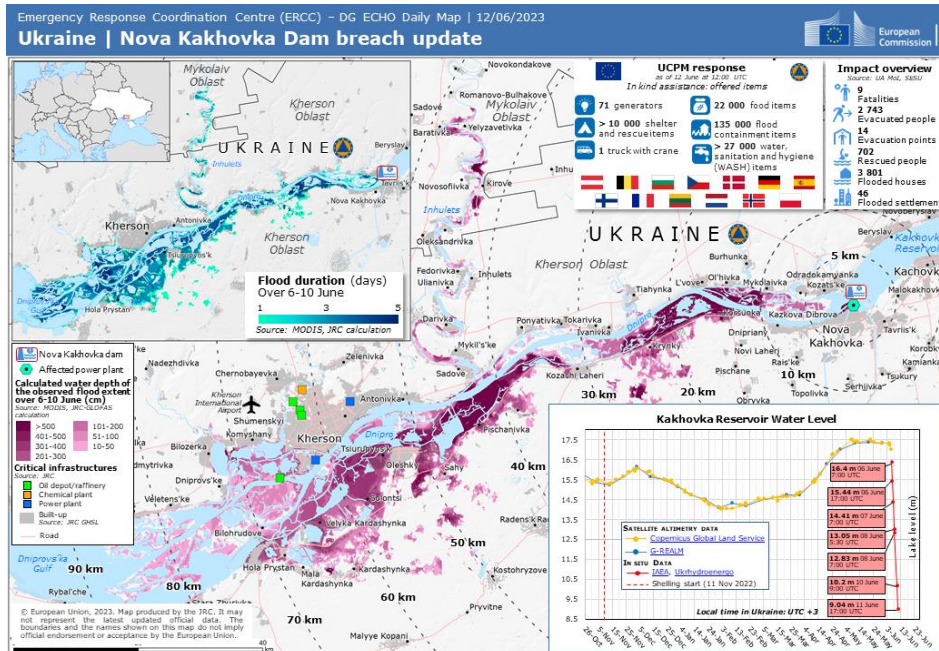
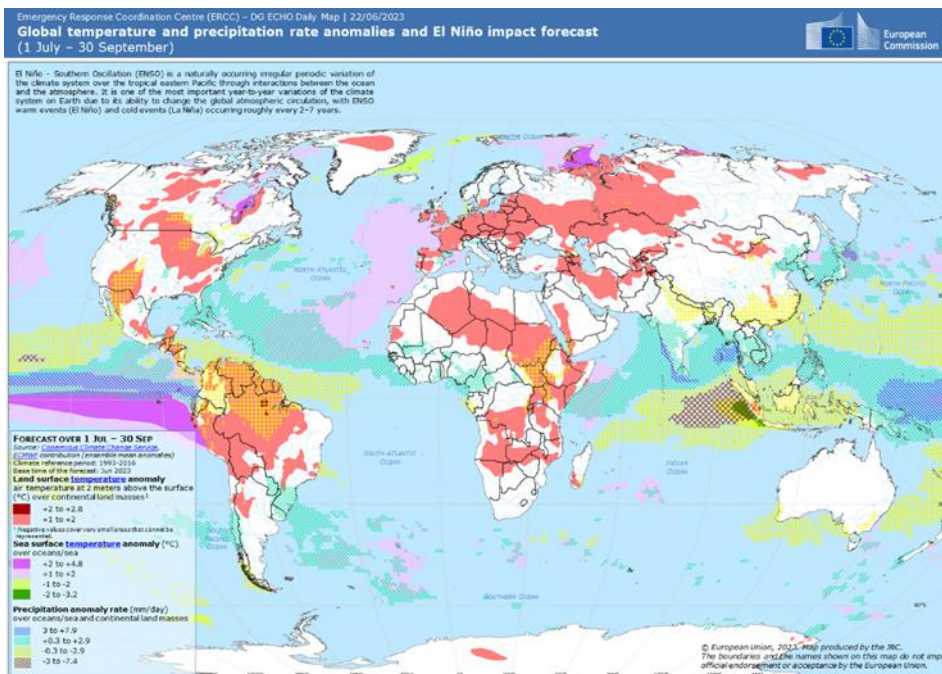


Figure 5. ECHO Daily Map of 22 June Global temperature and precipitation anomalies and El Niño.



2.5 ECHO Daily Maps by scale/event types, spatial distribution and comparison

Starting from monthly distribution and prevalence of event types (Figure 6, Figure 7), it is important to highlight that a total of 38 ECHO Daily Maps have been produced in this second trimester by the ECML team (and a number of these by means of a cooperation with other JRC teams, e.g. for floods-related topics). Among these 38 Daily Maps, one was produced in cooperation with the DG ECHO A3 SAS (24 April, on Türkiye and Syria seismic activity). The number of Daily Maps not directly produced by the ECML team (not analysed in the present report, as mentioned above in the general introduction) is 21. Thus, the total amount of Daily Maps produced in the whole period on concern is 59.

The event type with the highest number of maps is flood, followed by tropical cyclone. The most depicted countries are Ukraine following the Kakhovka Dam breach and Italy due to the severe weather floods and landslides that affected Emilia Romagna on May. In addition, the ECML team produced several other maps for the (not public) technical report on the Kakhovka Dam breach produced by the JRC.

May was the month with highest number of Daily Maps produced by the ECML team over April-June period: this intense activity is due mostly on the severe weather, floods and landslides occurred in Emilia Romagna Region and northern Balkans in the beginning of May and since mid-May (two separate big events). Is important to mention two tropical cyclones as well, MOCHA and MAWAR, in the Bay of Bengal (MOCHA) that hit Myanmar and Bangladesh, and in the Philippine Sea (MAWAR) which crossed Guam, Philippines, Taiwan and Japan.

Figure 6. Monthly distribution of ECHO Daily Maps per event type produced by ECML team.

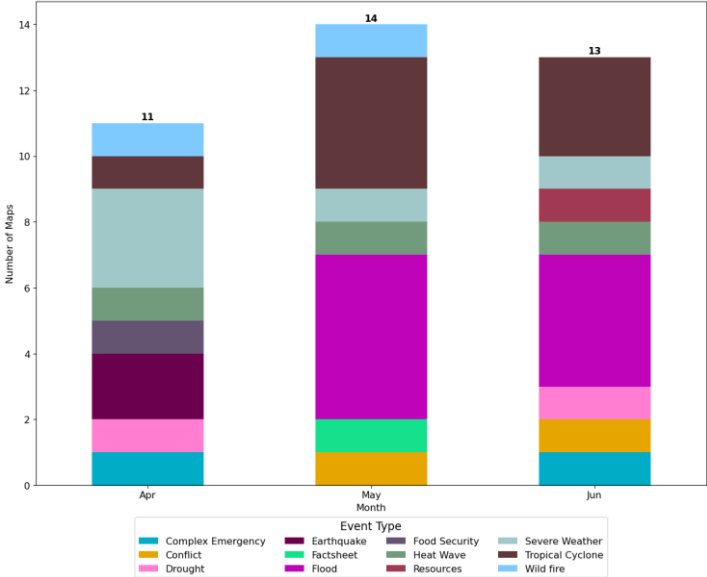
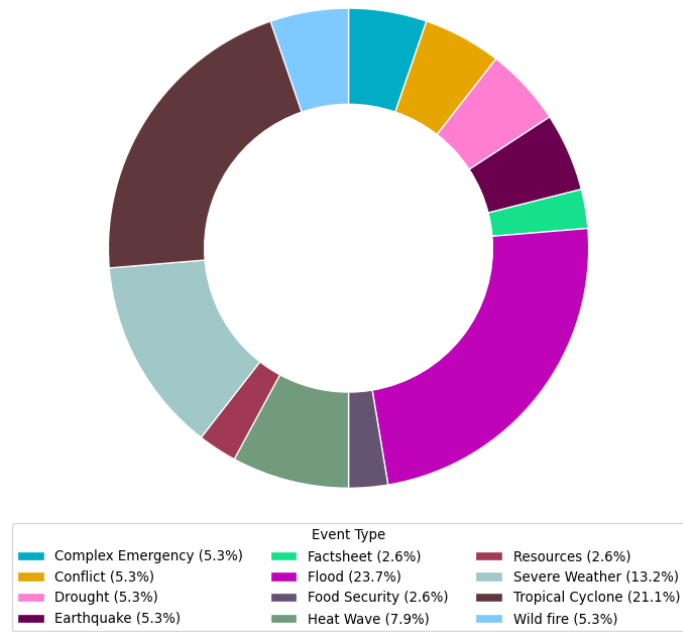


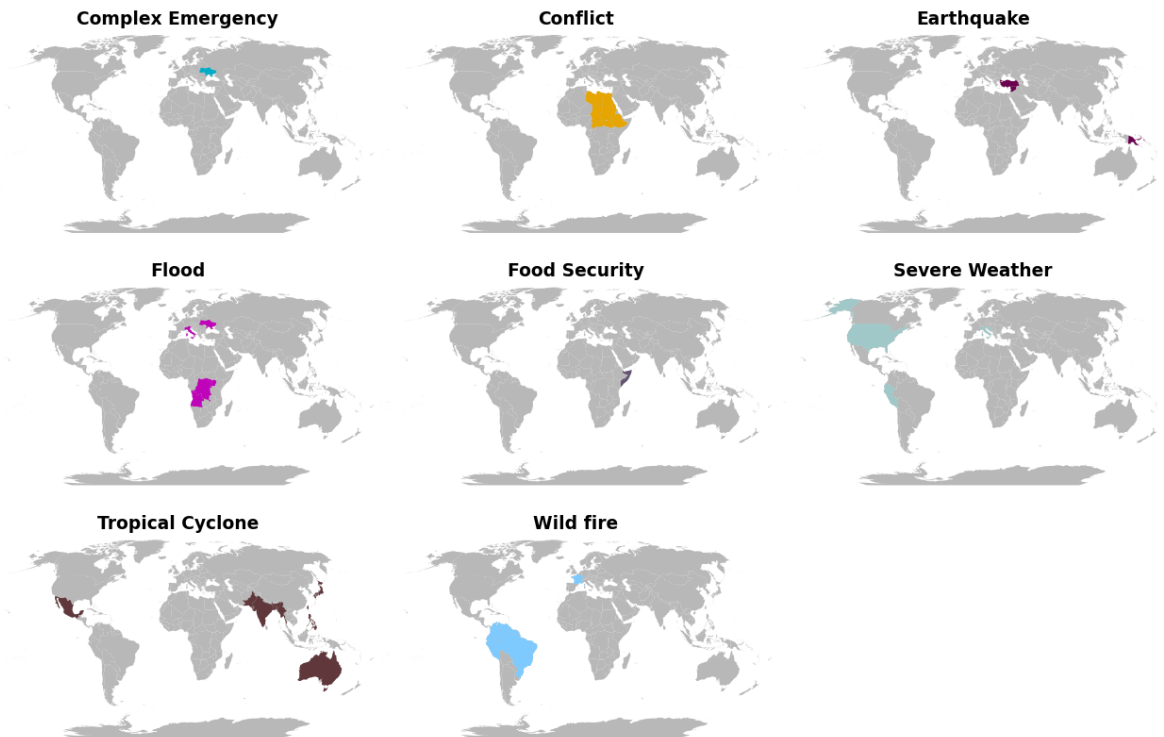
Figure 7. Event type prevalence (%) in ECHO Daily Maps produced by ECML team.



Flood is the event type with the highest number of Maps (Figure 6). This topic includes the floods occurred in Emilia Romagna (three maps), the Nova Kakhovka Dam breach (three maps) and the widespread floods caused in the rainy season experienced in DRC-Rwanda, Uganda and Angola (three maps).

Tropical cyclone is the second in the ranking of the most mapped event types, the areas of occurrence are the Arabian Sea (BIPARJOY in India, Pakistan), the Atlantic Ocean (BRET in Lesser Antilles and the Caribbean), Philippine Sea (MAWAR in Philippines, Taiwan, Japan, Guam and Northern Mariana Islands), Bay of Bengal (MOCHA in Myanmar and Bangladesh) and in the Indian Ocean (ILSA in Australia).

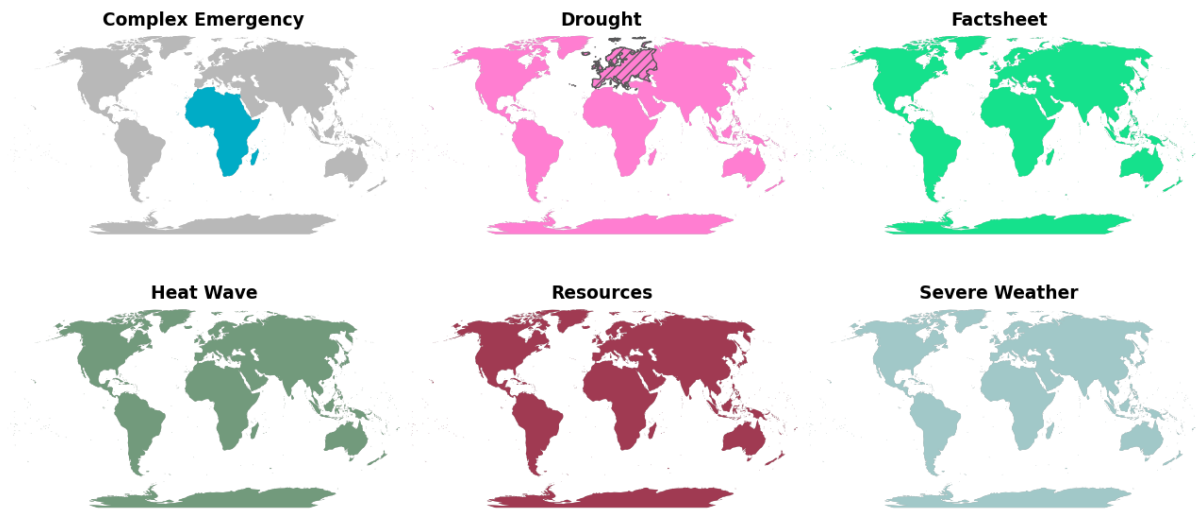
Figure 8. Spatial distribution of single and multi-country ECHO Daily Maps by event type produced by the ECML team.



The spatial distribution of events is presented both countrywide (Figure 8) and worldwide (Figure 9). The first aspect, the spatial distribution of single and multi-country maps, reveals clearly that severe weather, and floods

are the most significant mapped topics at the country-scale specifically in the western hemisphere (severe weather) and across the central Africa countries. The second event type to highlight is the tropical cyclone, that depicts its usual spatial distribution during this period of the year: northern Indian Ocean, Australia and Oceanian Countries but also the anticipated start of the eastern Pacific tropical cyclone season. Finally, also wildfires are well represented, due to the dry autumn occurred across the southern hemisphere.

Figure 9. Spatial distribution of single and multi-country ECHO Daily Maps by event type. Diagonal lines represent the long-lasting drought affecting Europe.



The spatial distribution of produced global and continental maps reveals the continuity in the interest of ERCC to focus on a number of given topics: factsheet (GDACS significant alerts since 2018)⁴ (Copernicus EMS Activations 2012-2023)⁵. Another global mapped topic that is mapped on monthly basis is represented by the Temperature anomalies map, which represents an important pillar of the ERCC policy.

The 17 June was the “World Day to combat the desertification and drought, for this reason the ERCC requested a global Daily Map published on 16 June⁶.

A comparison between the Q1 and Q2 has been done and the results (Figure 10 and Figure 11) show that severe weather and floods prevail in the Q2 period. The tropical cyclone topic is also well represented during the Q2 for its occurrence in the northern Indian Ocean and Oceania, but it is more represented in the Q1, due to the intense season that affected the southwestern Indian Ocean during the first trimester of the 2023. Finally, earthquakes were predominant in the Q1 (due to the seismic activity occurred in Türkiye and Syria during February 2023) than during the Q2. Is the contrary regarding the flood event that in Q1 has not been represented (no relevant events in this trimester) while in the Q2 was one of the most mapped hazards. In conclusion the other topics are equally distributed in both quarterly reports.

⁴ <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps?language=en-US#/maps/4503>

⁵ <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps?language=en-US#/maps/4513>

⁶ <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps?language=en-US#/maps/4523>

Figure 10. Comparison per event type between the Q1 (January to –March) and the Q2 (April to –June).

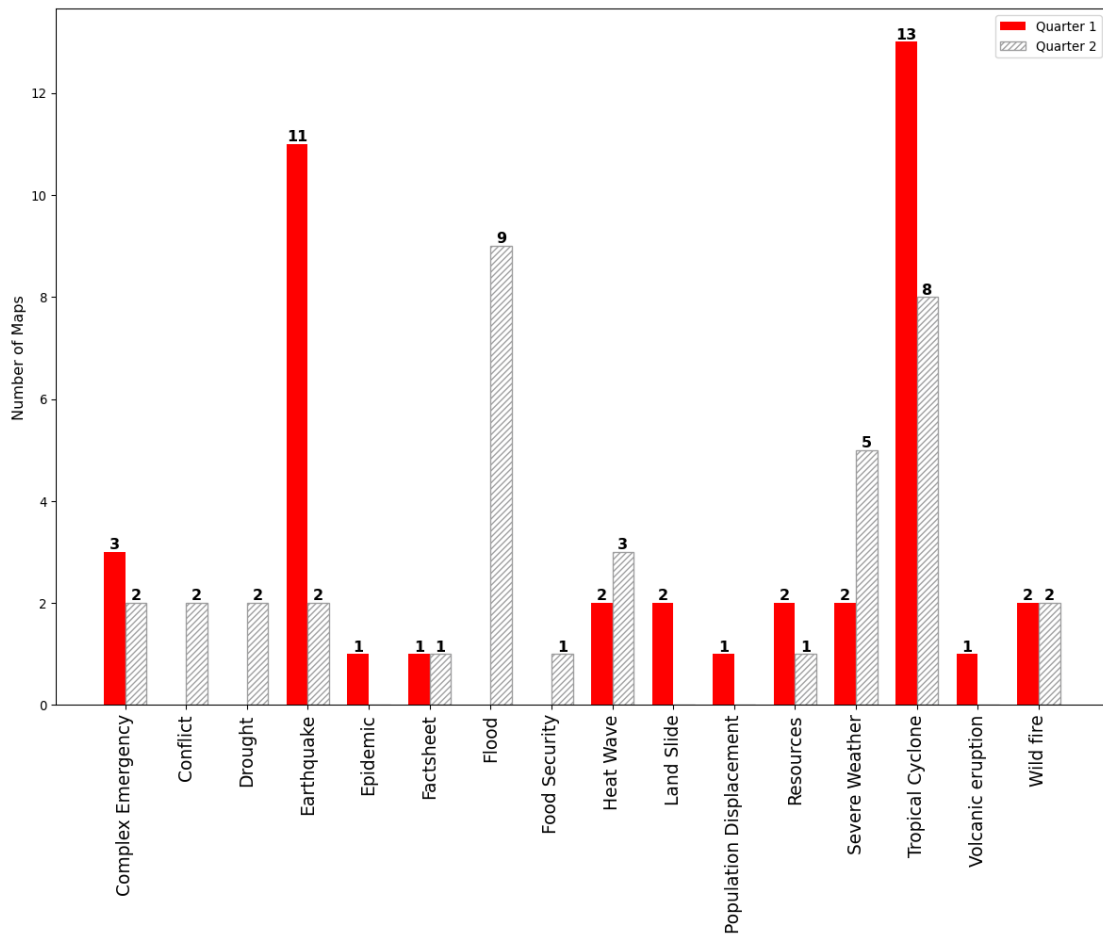
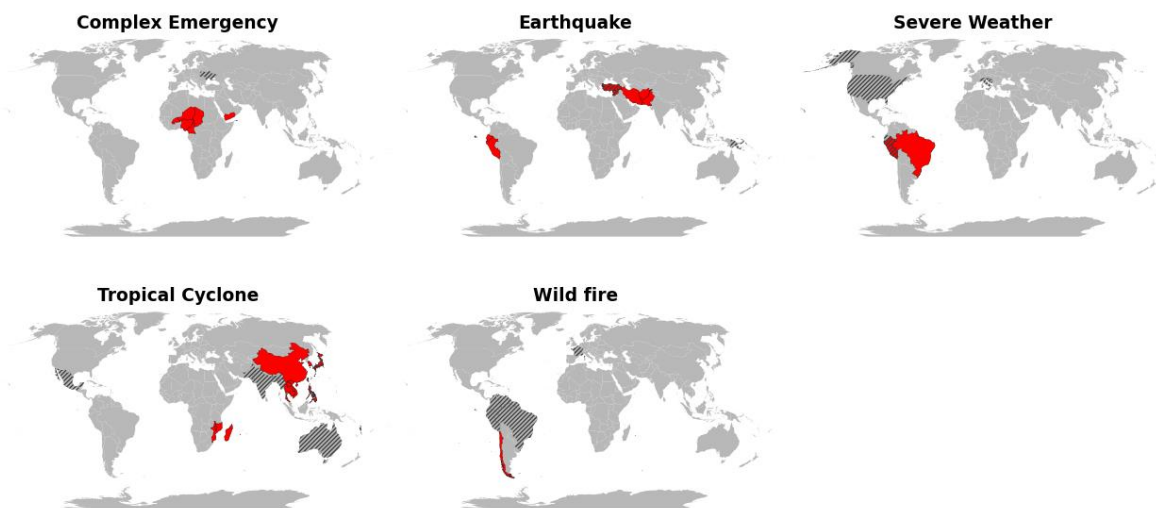


Figure 11. Spatial distribution comparison per event type between the Q1, in red (January to –March) and the Q2, diagonal shading (April to –June).

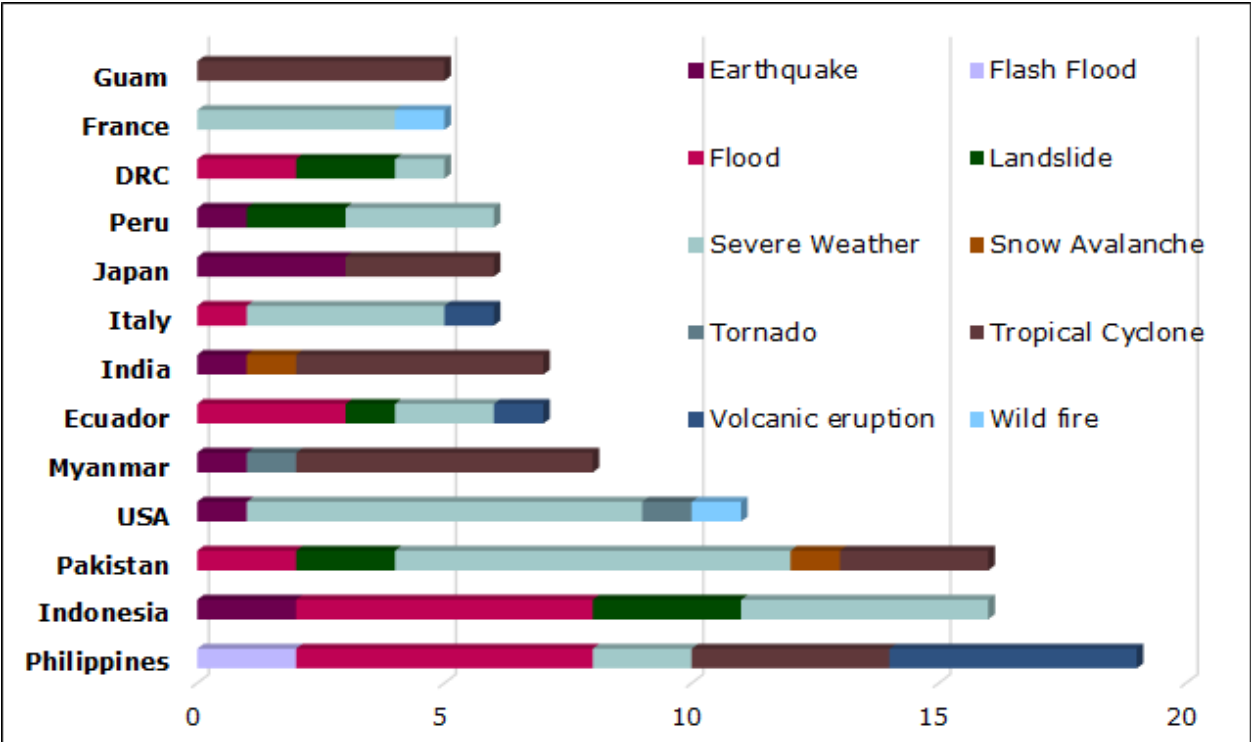


2.6 ECHO Daily Flash statistics

A total of 256 Items (a single item represents a report of a specific natural event in a specific country, see chapter 1) have been produced in this first trimester of the year (Figure 12). The event type with the highest number of items is severe weather (61 items) followed by flood (56 items) and tropical cyclone (26 items). The

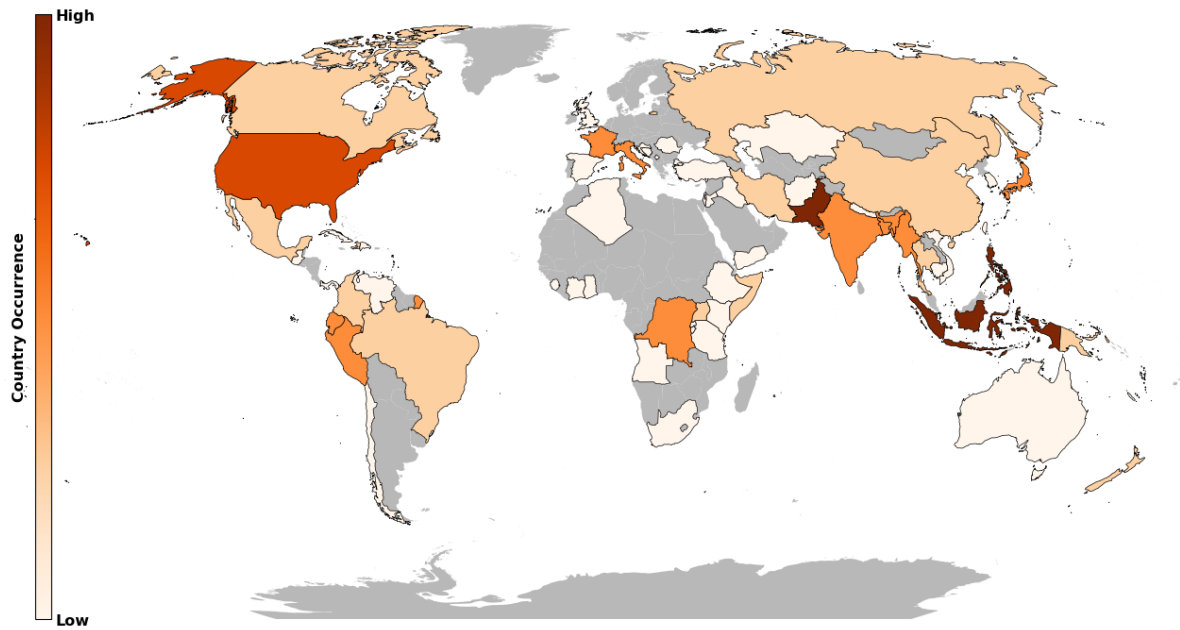
countries with the highest number of items are Philippines (19 items), Indonesia and Pakistan (16 items each) and USA (11 items).

Figure 12. Countries with the highest number of ECHO Daily Flash items per event type.



Over the period of concern, Philippines has been affected by different event types, particularly by the volcanic activity of Mount Mayon that caused the displacement of more than 20 000 people and impacted more than 40 000 others. Other events like floods, landslides and heavy rainfall brought by tropical cyclone MAWAR, tropical depression AMANG and the effects of the monsoon rains, hit several parts of Philippines. Following the pre-monsoon and monsoon season, started in June, Pakistan is facing a huge amount of human loss. In addition, the passage of tropical cyclone BIPARJOY, caused thousands of evacuated people in southern Pakistan. Furthermore, also Indonesia, experienced in this trimester heavy rainfall that resulted in floods, landslides and severe weather-related incidents. Two strong earthquakes events affected the Indonesian country in April but fortunately no relevant humanitarian impact has been recorded.

Figure 13. Spatial distribution of items of the ECHO Daily Flash per country.



The map shows the spatial distribution of the occurrence of the Daily Flash items across the world (Figure 13).

In southern and south-eastern Asia, the beginning of the monsoon season gives an important influence on the number of published items, not considering other events like volcanic eruptions (mostly the Mount Mayon volcano), cyclones (BIPARJOY, MAWAR and MOCHA) and earthquakes.

In Europe, Italy and France are the most reported countries following the severe weather events, most of them occurred in May, particularly in Emilia Romagna Region where more than 10 people died after heavy rainfall, flood and landslides. In France, the severe weather affected southern and central regions of the Country during the second half of June, leading to two fatalities, several injured people and damage.

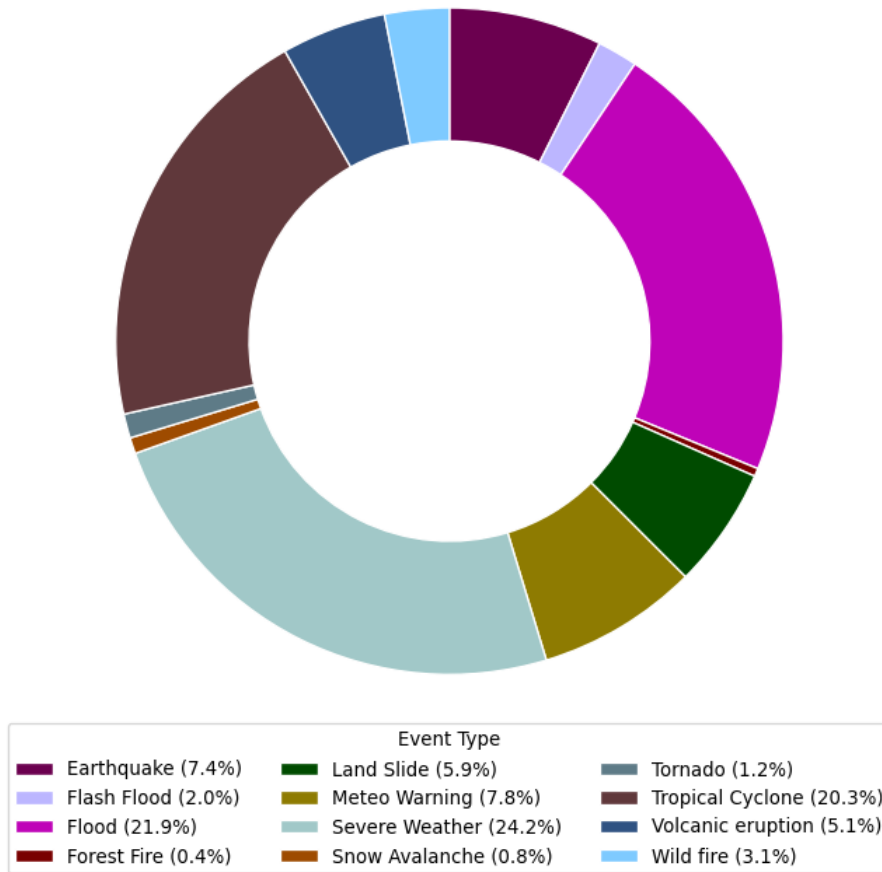
In the African continent the Democratic Republic of the Congo's items have been published several times due to the floods and landslide events of the early May that resulted in hundreds of fatalities. Is important also to mention Uganda and Somalia, the first mostly for the floods and landslides occurred in the beginning of May and the second for the Gu Rainy season that impacted the country on May-June and resulted in casualties, displacements and damage.

In northern America, severe weather events and wildfires (most of them in California) are the main topics while in Canada most of the items described the critical situation of the wildfires that have been burning more than 10 million ha of area across the country, from east to west.

Considering that the hurricane season is not still hardly affecting the countries of central America, only Mexico (for tropical storm BEATRIZ), Haiti (for severe weather and a deadly earthquake) and the Lesser Antilles (for tropical storm BRET) have been described in the Daily Flash over these three months.

In southern America, Peru Colombia and Brazil are the countries with the major number of published items considering that, in this trimester, they have been hit by severe weather-related incidents, floods, landslides, two earthquakes and one relevant volcanic eruption.

Figure 14. Event type prevalence (%) in ECHO Daily Flash.



Severe weather is the event type most written in the ECHO Daily flash activities, eight of them describe events occurred in USA, five in Indonesia and four in France and Italy, the rest of the items are located across more than 25 other countries. The second event type in the ranking is flood that is distributed across several countries especially in the Asia continent *with* Indonesia and Philippines with six published items each one.

3 ECHO Situation Maps/Infographics

3.1 General usage

Differently from the daily maps, rather than monitoring single events over a specific area and for a short time, situation maps tend to be created to summarize the overall “situation” of countries, group of countries or continents, charting complex interactions between various events for prolonged periods.

According to the users’ feedback few of the main usages of these maps over the second quarter (Q2) of the year were:

- Internal and external presentations/briefs
- Visualize needs and DG ECHO partner coverage over a specific area
- Provide insight to field staff
- Internal programming discussions
- Projects dissemination with other services

More specifically, during Q2 these maps focused on:

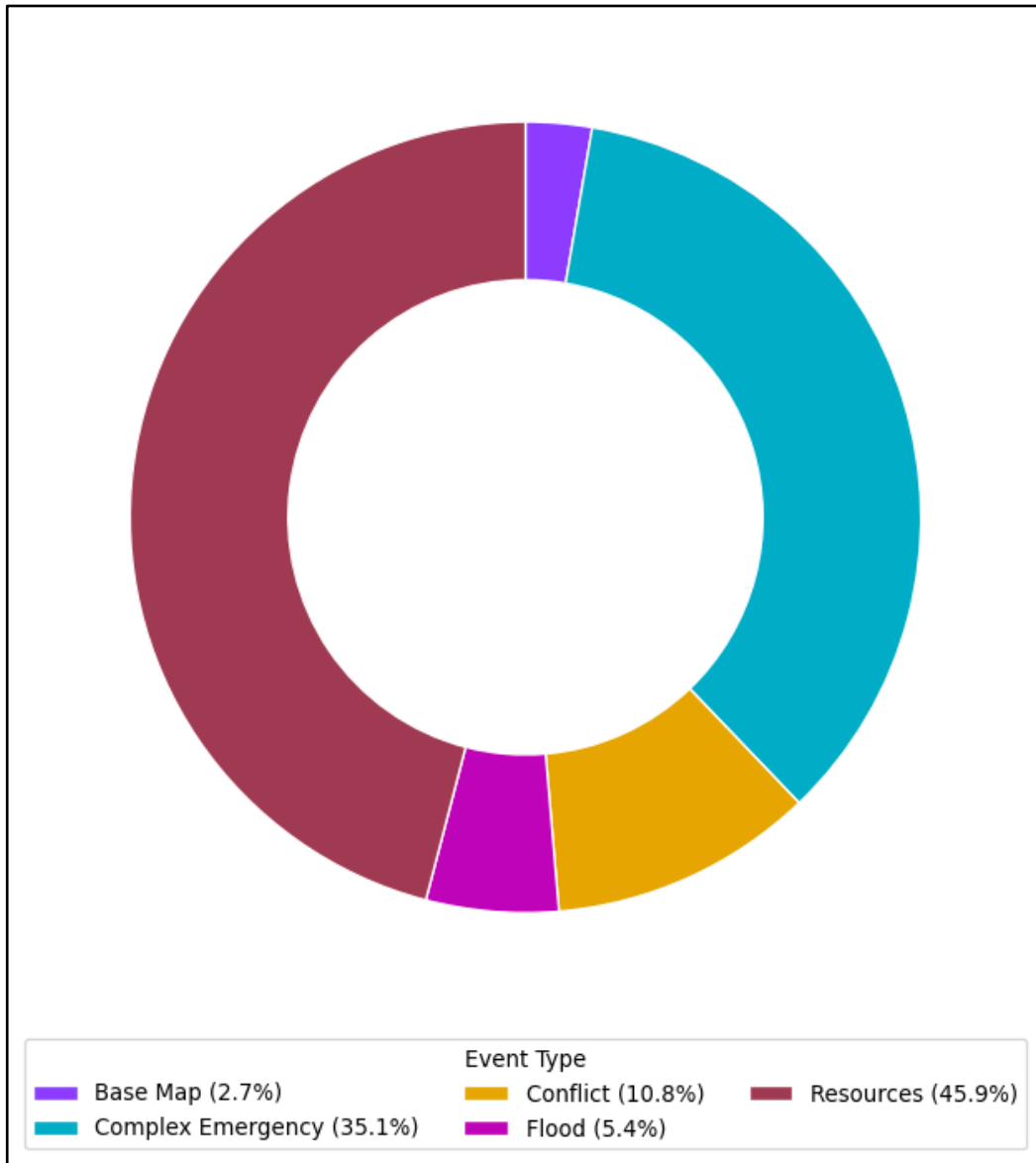
- DG ECHO Funding and humanitarian assistance (partners, sectors of intervention and locations)
- Complex humanitarian crisis:
 - o Food insecurity (people at risk of food crisis, and in need)
 - o People displacement (refugees, internally displaced persons, returnees)
 - o Main conflicts, clashes and hostilities
- Overview of major catastrophic events:
 - o Base maps
 - o Complex emergency
 - o Conflicts
 - o Floods
 - o Funds allocation

Due to the fact that the purpose of the majority of them is to be used within the Commission for presentations and discussion, their nature is inherently internal (not freely accessible) rather than public. It is for this reason that these maps are not shown in this report, as done with the daily maps described above. The situation maps are rather presented here in terms of general statistics to highlight their event types, where and how often they happened. In addition, the production of the two quarters of this type of maps are also compared, showing the differences, where found, in event types occurrence and spatial distribution.

3.2 Overall Q2 ECHO Situation Maps production

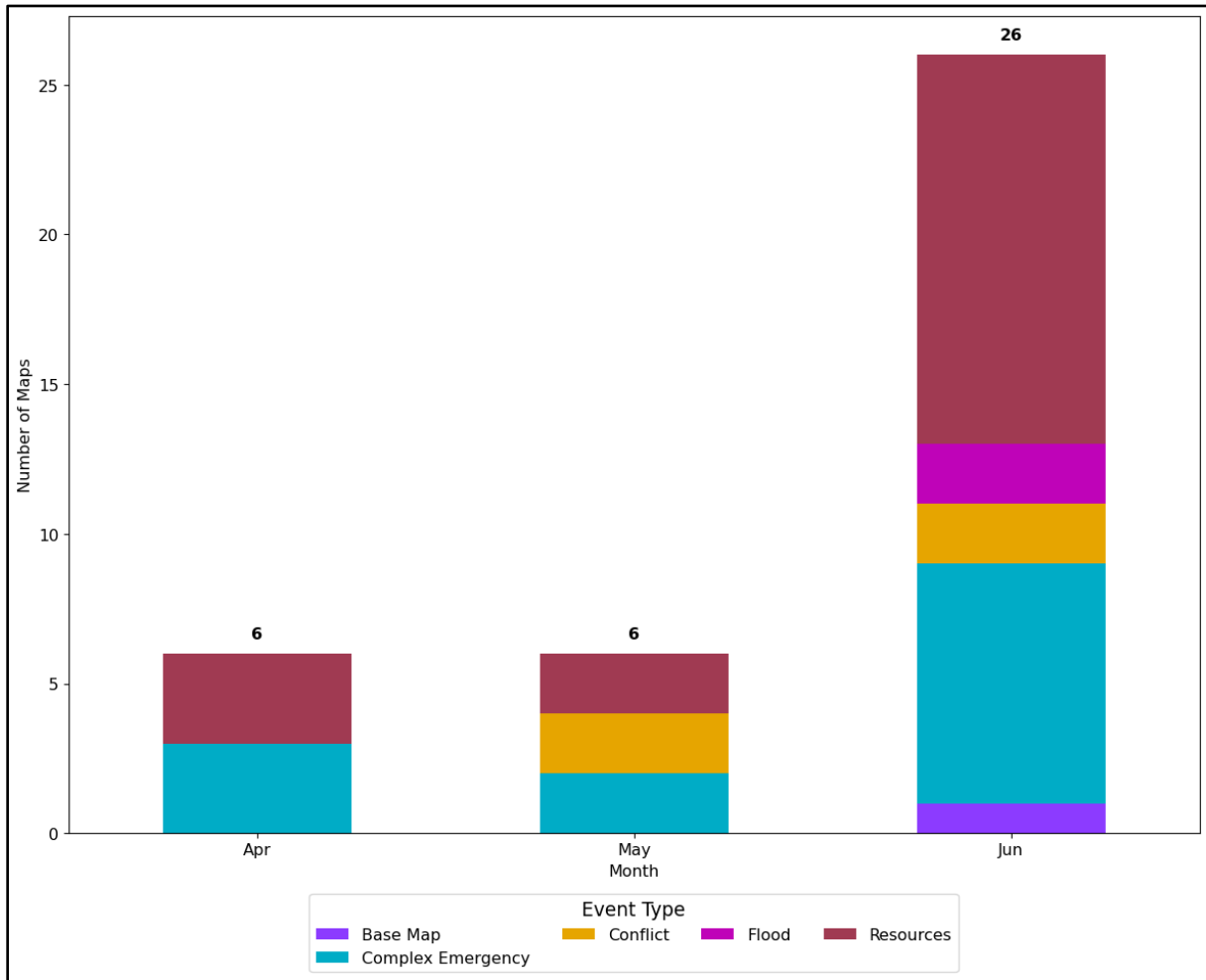
Throughout Q2, the team created a total of 38 Situation maps. As shown in the graph of Figure 15, the most prevalent event type (47.4%) is the one labelled “Resources” (type used to indicate those maps that show funds allocation from DG ECHO Partners), followed by “Complex Emergency” (34.2%). The rest of the event types, which fall into the category of single catastrophic event are “Conflict” (10.8%) and “Flood” (5.4%) while “Base maps”, not representing a proper event per se, account for 2,7% of the total quarterly map production.

Figure 15. Event type prevalence (%) in ECHO Situation Maps.



The prevalence of Resources-related maps indicates that the predominant purpose of situation maps is to chart economic interventions of DG ECHO Partners in a specific policy area, while the high incidence of Complex Emergency reinforces the previously stated concept that these maps are prevalently used as a visual summary of events interactions rather than focusing on single ones. To give a temporal overview of the quarterly map production, Figure 16 shows the total number of maps produced each month by event type.

Figure 16. Total number of ECHO Situation Maps by event type for each month.



Besides been subdivided temporally and by event type, situation maps can also be spatially analysed. In this perspective, the grand total of 38 maps can be divided into 27 maps produced at country and multi-country scale (18 and 9 respectively) and 11 at continental scale.

3.3 Spatial distribution of event types

3.3.1 Event Type distribution in Country and Multi-Country ECHO Situation Maps

When analysing the spatial distribution of event types of single and multi-country maps (Figure 17), we can see that Complex Emergency is the predominant type throughout the African Continent. Both the Sahel region and the Horn of Africa are the most charted ones, being interested by the coexistence of population displacement, food insecurity as well conflicts. Regarding the latter event type, the figure also shows that maps were produced for Sudan where the ongoing conflict, started on 15 April between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF), is extremely concerning. Funds allocation (Resources event type) of several African countries was also mapped.

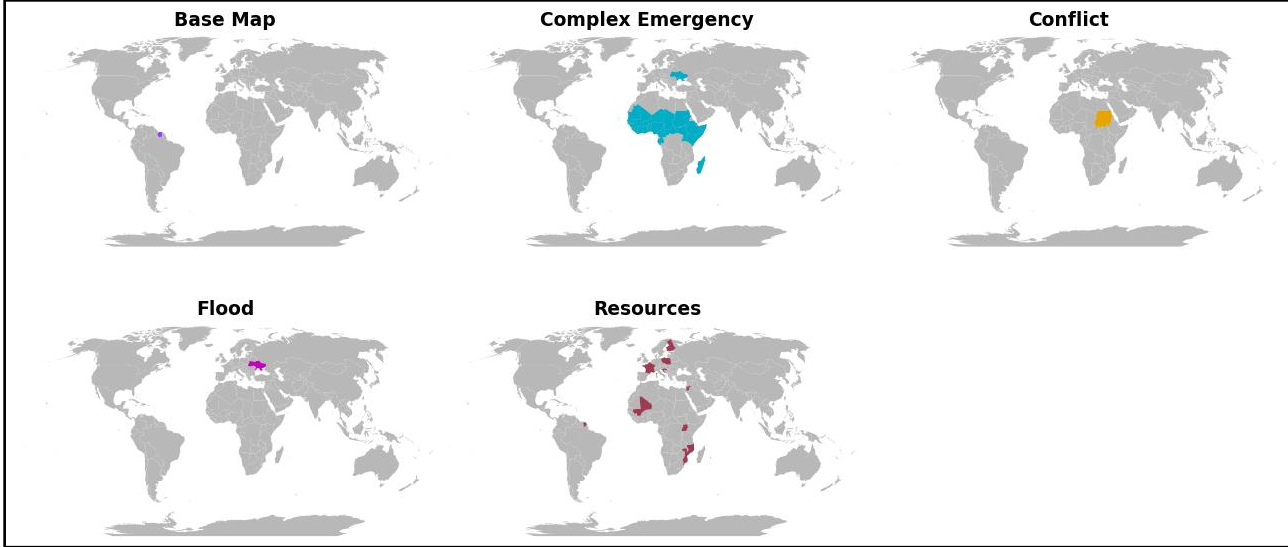
As far as the European Continent is concerned, few countries are represented by Resources as event type. The figure highlights a map about Croatia, France, and Poland joining Finland in hosting the rescEU stockpiles concerning the preparedness in dealing with chemical, biological, radiological, and nuclear (CBRN) hazards.

Not surprisingly, particular attention was given to Ukraine. Besides the Complex emergency event type due to the conflict, the country is also characterized by Flood. On 6 June, the Nova Kakhovka Dam was breached causing extensive flooding along the terminal part of the Dnieper River (Kherson Oblast). The event was

thoroughly monitored by the ECML team which also produced and delivered many technical reports to the ERCC. The ECML team also produced three ECHO Daily Maps (see above the relevant section) on the event since the very beginning to mid-June, but it is important to note that the most updated depicted situation of the Nova Kakhovka Dam breach is represented by two ECHO Situation Maps of 16 June⁷ and 21 June⁸ (with the flood duration up to 20 June, for this latter map).

As a final remark we can see that “Base Map” was also present as event type. The only one produced was on Suriname. These maps are generally requested and updated every time there is the need to change some sort of geo-political feature (this case was the deletion of a disputed area in the nearby area in French Guyana). It is for this reason that this kind of maps are not so frequent, and always represented in a small percentage (Figure 15). Table 2. List of Country and Multi-Country ECHO Situation Maps for Q2 in chronological order. briefly summarize the country and multi-country map production for Q2.

Figure 17. Event Type distribution in Country and Multi-Country ECHO Situation Maps for Q2.



⁷ <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/4522>

⁸ <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps/4541>

3.3.2 Event Type distribution in ECHO Continental Situation Maps

Contrary to the first part of the year (Q1), when the event type distribution of Continental Situation Maps followed a more dispersed pattern, over the second quarter this has a more consistent and stable distribution. In fact, the only event type for these maps over the analysed period is Resources with a worldwide distribution. Although we are fully aware that calling the world a continent is a mistake, for the sake of discussion throughout this document, we will consider it as part of the Continental subdivision.

While the first quarter is always characterized by a production of continental maps mostly related to an overview of the previous year, over Q2 the maps mainly refer to updates for the current year of the DG ECHO Partners funding (worldwide). As a confirmation of the event type predominance and its distribution, **Error! Reference source not found.** lists the total Continental Maps production over Q2 in chronological order. Quarter comparison: Q1 and Q2 event type occurrence and distribution

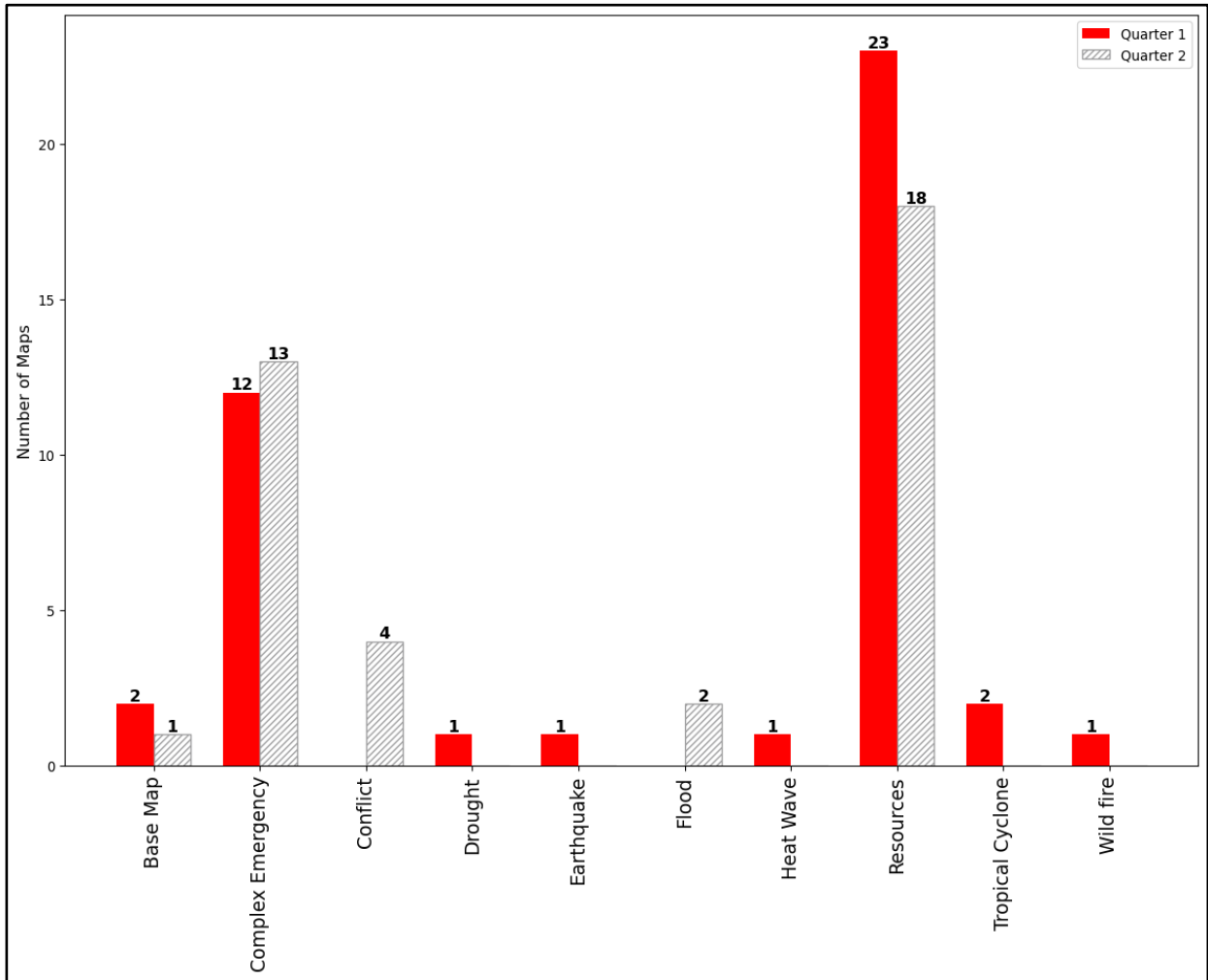
Due to the constant worldwide distribution of event types for Continental Maps over Q2, the following comparison will entirely focus on event types in Country and Multi-countries maps.

When comparing the two first quarters of the year (Figure 18) we can see the consistent presence of Complex Emergency and Resources as event type (for the spatial distribution of these events regarding the first quarter, please refer to the previous Quarterly Report, JRC133755⁹). As previously explained, the Base Map incidence is somehow low while the remaining of the listed event types are uniquely represented either in the first or in the second quarter.

Compared with the second one, the first quarter appears to have a more diverse incidence of event types but with a smaller number of maps produced for each event. All the events occurring during Q1 are environmentally related, while Q2 is characterized by a more directly human induced phenomena (either Conflict or Flood due to the shelling of the dam).

⁹ The report is available here: <https://op.europa.eu/en/publication-detail/-/publication/ffb785fe-31ab-11ee-946a-01aa75ed71a1/language-en>

Figure 18. Event type incidence: quarter comparison.



As an additional analysis, we compared only the event types occurring in both Q1 and Q2 to highlight possible differences and similarities in their spatial distribution. Maintaining the same colour coding of the chart in Figure 18 (red events occurred over Q1 and hatched for those occurring in Q2), Figure 19 represent a superimposition of the two time periods.

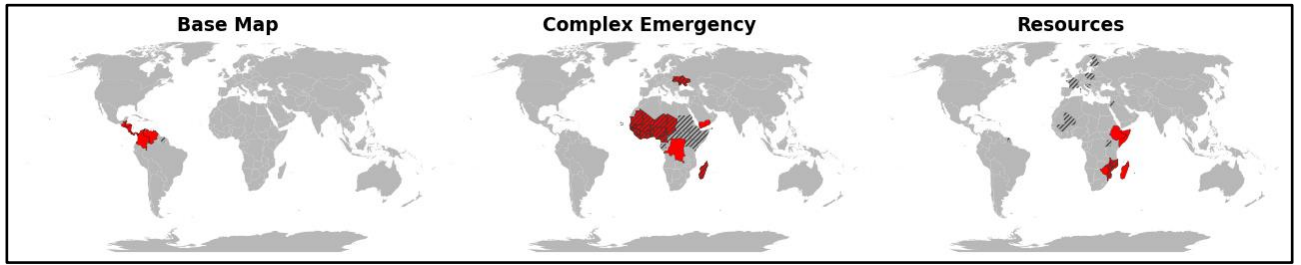
The event type occurring in both quarters are respectively: Base Map, Complex Emergency and Resources.

As represented in the figure, Base Maps (the only one produced was Suriname) are located in the Southern American continent; Resources maps maintain their presence in Africa, with a slight north-western shift due to rescEU stockpiles map, Lebanon, as well as Mali and Uganda (see **Error! Reference source not found.** for details).

Of particular interest is the widening of Complex Emergency maps in the African continent: here we can see the addition of the Horn of Africa to the already analysed Sahel region testifying the enduring and the expansion of this event throughout the continent.

The conflict in Ukraine and the subsequent humanitarian crisis, is persistently kept under monitoring.

Figure 19. Event type distribution for common event types between the two quarters.



Events occurred during Q2 (hatched countries), superimposed to the event type distribution in Q1 (red countries).

4 Conclusions

The present report (the second release of a series of quarterly reports) represents daily and non-daily activities of the ECML Mapping Team in support to DG ECHO and to the ERCC and it is a sort of reasoned portfolio of all the situational awareness products (both in form of maps and brief reports) produced for and collected in the ERCC portal. This document aims to support the reader to have a knowledge of what happen periodically across the world, by means of an analysis of the three main pillars of the ERCC portal: ECHO Daily Flash, ECHO Daily Map and ECHO Situation Maps produced by the ECML team. This document is also meant to contribute to the deliverable “Enhanced Global Monitoring” of the JRC portfolio 25, “Enhanced Situational Awareness for Crisis Management”, planned for the end of 2023.

The ERCC portal is partially an open access portal and reaches a very large general audience, mainly through the first two mentioned products (ECHO Daily Flash, ECHO Daily Map), but also by means of a number of ECHO Situation Maps with public access. Moreover, this latter product is mainly intended for a specialised audience/user (internal to DG ECHO, ERCC and the European Commission) and it is accessible for its large part with restricted access. The ERCC portal is designed, developed, implemented and maintained by the ECML team for the ERCC.

During the period of concern one main common aspect between ECHO Daily Maps and ECHO Situational Maps is represented by the activity done by JRC for the dam breach in Ukraine (which have been collected in several scientific reports that involved numerous JRC Units) and for the internal conflict in Sudan. About Ukraine, two Situation Maps and four Daily Map have been produced while regarding Sudan, the ECML team worked on four Situation Maps and two Daily Maps.

This highlights the strict relationships between these two mapping products (ECHO Daily Maps and ECHO Situational Maps), that considered together are not simply a cartographic support to DG ECHO and ERCC but above all one of the most significant (also from a quantitative point-of-view) analytical product (among others, e.g. JRC Emergency Report) produced by the JRC for DG ECHO, ERCC and the European Commission.

Figure 20. Visit of Commissioner Lenarčič and EU Member/Participating States representatives to the ERCC, with ECHO Daily/Situation Maps (and GDACS website) being shown in the video wall of the operations room in Brussels (source: Knowledge Network Newsletter - Issue 9 - July 2023).



Commissioner Lenarčič welcomes ministers to a visit of the ERCC Operations Room © EU

List of abbreviations and definitions

DG ECHO	Directorate-General for European Civil Protection and Humanitarian Aid Operations
ECML	European Crisis management Laboratory
ECMWF	European Centre for Medium-Range Weather Forecasts
EMSN	Emergency Management Service - Risk and Recovery Mapping
EMSR	Emergency Management Service – Rapid Mapping
ERCC	Emergency Response Coordination Centre
GDACS	Global Disaster Alert and Coordination System
GDO	Global Drought Observatory
GFS	Global Forecast System
GHSL	Global Human Settlement
GLOFAS	Global Flood Awareness System
GPM	Global Precipitation Measurement
GWIS	Global Forest Fire Information System
HWRF	Hurricane Weather Research and Forecast System
JTWC	Joint Typhoon Warning Center
MODIS	Moderate Resolution Imaging Spectroradiometer
NOAA	National Oceanic and Atmospheric Administration
UCPM	Union Civil Protection Mechanism
USGS	United States Geological Survey

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Annex I

The public ECHO Daily Maps can be found at the link <https://erccportal.jrc.ec.europa.eu/ECHO-Products/Maps#/maps?pageIndex=1>. All the maps can be consulted using the proper filter (by free text, the publication date, the Country, the Continent and the event type). In the tables in Annex I only the maps produced by the ECML team are included.

Table 1 List of all Country and Multi-Country ECHO Daily Maps for Q2 in chronological order produced by the ECML team.

Title	Published On Date	Event Type	Country/multy country- continent
<i>Europe Drought situation</i>	3-Apr	Drought	Multicountry - Europe
<i>USA Tornadoes and strong wind</i>	4-Apr	Severe Weather	United States of America
<i>Papua New Guinea 7.0 M Earthquake of 2 April</i>	5-Apr	Earthquake	Papua New Guinea
<i>World Temperature Anomalies in March 2023</i>	12-Apr	Heat Wave	Multicountry - World
<i>Australia Tropical Cyclone ILSA</i>	13-Apr	Tropical Cyclone	Australia
<i>Peru Severe weather</i>	14-Apr	Severe Weather	Peru
<i>France, Spain Wildfires</i>	17-Apr	Wild fire	France
<i>Ukraine, Moldova DG ECHO-funded humanitarian assistance update</i>	19-Apr	Complex Emergency	Multicountry - Europe
<i>Türkiye, Syria Seismic activity and EU response</i>	24-Apr	Earthquake	Multicountry
<i>Somalia Food insecurity</i>	27-Apr	Food Security	Somalia
<i>Ecuador Severe weather, floods and landslide</i>	28-Apr	Severe Weather	Ecuador
<i>Angola Floods</i>	2-May	Flood	Angola
<i>Amazon River Basin Wildfires in 2022</i>	8-May	Wild fire	Multicountry - South America
<i>Democratic Republic of the Congo, Rwanda Floods and landslides</i>	10-May	Flood	Multicountry
<i>Myanmar, Bangladesh Tropical Cyclone MOCHA</i>	12-May	Tropical Cyclone	Multicountry
<i>Myanmar, Bangladesh Tropical Cyclone MOCHA</i>	15-May	Tropical Cyclone	Multicountry
<i>Uganda Floods and landslides</i>	17-May	Flood	Uganda

<i>Italy and northern Balkans Severe weather</i>	19-May	Severe Weather	Multicountry
<i>Italy Floods and landslides</i>	22-May	Flood	Italy
<i>Guam, Northern Mariana Islands Tropical Cyclone MAWAR</i>	23-May	Tropical Cyclone	Oceania
<i>World Temperature Anomalies in April 2023</i>	24-May	Heat Wave	Multicountry - World
<i>Sudan Conflict and population displacement</i>	25-May	Conflict	Sudan
<i>Italy Floods and landslides – EU response</i>	26-May	Flood	Italy
<i>Philippines, Taiwan, Japan, Guam (U.S), U.S. CNMI Tropical Cyclone MAWAR</i>	30-May	Tropical Cyclone	Multicountry
<i>GDACS significant alerts since 2018</i>	31-May	Factsheet	Multicountry - World
<i>Italy Floods and landslides – EU response</i>	1-Jun	Flood	Italy
<i>Ukraine Nova Kakhovka Dam breach</i>	6-Jun	Flood	Ukraine
<i>Copernicus EMS Activations 2012-2023</i>	8-Jun	Resources	Multicountry - World
<i>Ukraine Nova Kakhovka Dam breach update</i>	8-Jun	Flood	Ukraine
<i>Ukraine Nova Kakhovka Dam breach update</i>	12-Jun	Flood	Ukraine
<i>India, Pakistan Tropical cyclone BIPARJOY</i>	13-Jun	Tropical Cyclone	Multicountry
<i>World Day to combat desertification and drought (17 June)</i>	16-Jun	Drought	Multicountry - World
<i>Sudan Conflict and population displacement update</i>	19-Jun	Conflict	Sudan
<i>World Temperature Anomalies in May 2023</i>	21-Jun	Heat Wave	Multicountry - World
<i>Global temperature and precipitation rate anomalies and El Niño impact forecast (1 July – 30 September)</i>	22-Jun	Severe Weather	Multicountry - World
<i>Lesser Antilles, The Caribbean Tropical Cyclone BRET</i>	23-Jun	Tropical Cyclone	Multicountry
<i>West and central Africa Complex crisis</i>	26-Jun	Complex Emergency	Multicountry - Africa
<i>Mexico Tropical cyclone BEATRIZ</i>	30-Jun	Tropical Cyclone	Mexico

Table 2. List of Country and Multi-Country ECHO Situation Maps for Q2 in chronological order.

Title	Publication Date	Event Type	Country/multi-country: continent
<i>Greater Horn of Africa (GHoA) Complex Humanitarian Crisis</i>	3-Apr	Complex Emergency	Multicountry - Africa
<i>13/04/2023 - Ukraine - Moldova DG ECHO-funded humanitarian assistance update</i>	13-Apr	Complex Emergency	Multicountry - Europe
<i>MOZAMBIQUE - ongoing projects 2023</i>	17-Apr	Resources	Mozambique
<i>MOZAMBIQUE - ongoing and under-negotiation projects 2023</i>	17-Apr	Resources	Mozambique
<i>Uganda Disaster Preparedness</i>	20-Apr	Resources	Uganda
<i>Madagascar - Food Insecurity</i>	21-Apr	Complex Emergency	Madagascar
<i>Sudan - Conflict and population displacement</i>	3-May	Conflict	Sudan
<i>08/05/2023 - Ukraine - Moldova DG ECHO-funded humanitarian assistance update</i>	8-May	Complex Emergency	Multicountry - Europe
<i>Uganda Disaster Preparedness</i>	12-May	Resources	Uganda
<i>Kenya - DG ECHO's response 2023</i>	15-May	Complex Emergency	Kenya
<i>Sudan - Conflict and population displacement</i>	16-May	Conflict	Sudan
<i>Member States hosting rescEU CBRN stockpiles</i>	17-May	Resources	Multicountry - Europe
<i>Sudan - conflict and population displacement</i>	1-Jun	Conflict	Sudan
<i>Niger multi crisis - April 2023</i>	1-Jun	Complex Emergency	Niger
<i>West & Central Africa - complex crisis</i>	6-Jun	Complex Emergency	Multicountry - Africa
<i>Sudan - Crisis Report No. 4</i>	15-Jun	Conflict	Sudan
<i>West & Central Africa - complex crisis</i>	16-Jun	Complex Emergency	Multicountry - Africa
<i>Main shocks: Conflict & Natural Hazards</i>	16-Jun	Complex Emergency	Multicountry - Africa
<i>Ukraine Nova Kakhovka Dam breach update</i>	16-Jun	Flood	Ukraine
<i>Niger multi crisis - June 2023</i>	16-Jun	Complex Emergency	Niger

<i>Niger multi crisis - June 2023</i>	16-Jun	Complex Emergency	Niger
<i>Greater Horn of Africa Complex Crisis</i>	19-Jun	Complex Emergency	Multicountry - Africa
<i>Ukraine Nova Kakhovka Dam breach update</i>	21-Jun	Flood	Ukraine
<i>Ukraine - Moldova DG ECHO-funded humanitarian assistance update</i>	23-Jun	Complex Emergency	Multicountry - Europe
<i>Suriname Base Map</i>	23-Jun	Base Map	Suriname
<i>Jordan ECHO Supported Operations 2023</i>	26-Jun	Resources	Jordan
<i>Mali - European Commission Humanitarian Response 2023</i>	28-Jun	Resources	Mali

Table 3. List of continental ECHO Situation Maps in chronological order.

Title	Publication Date	Event Type	Continent
<i>WFP - World Food Programme European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World
<i>WHO European Commission Humanitarian Funding 2023</i>	21-Jun	Resources	World
<i>UNICEF - United Nations International Children's Emergency Fund European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World
<i>UNHCR - UN Refugee Agency European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World
<i>Map to show current 2023 funding to strategic partner ICRC</i>	21-Jun	Resources	World
<i>IRC-DE European Commission Humanitarian Funding 2023</i>	21-Jun	Resources	World
<i>IOM - International Organization for Migration European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World
<i>EU STC Members European Commission Humanitarian Funding 2023</i>	21-Jun	Resources	World
<i>OCHA European Commission Humanitarian Funding 2023</i>	21-Jun	Resources	World
<i>ACTED European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World
<i>Concern Worldwide European Commission Humanitarian Funding 2023 (as at 15/06/2023)</i>	21-Jun	Resources	World

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